

WHAT IS CLAIMED IS:

1. A liquid, radiation-curable composition comprising:

- Sub C2
- a) 40 to 80 percent by weight of a liquid component consisting of one or more than one polyfunctional compound having at least two groups capable of reacting via or as a result of a ring-opening mechanism to form a polymeric network,
 - b) 0.1 to 10 percent by weight of a cationic photoinitiator or a mixture of cationic photoinitiators,
 - c) 2 to 30 percent by weight of a compound having at least one unsaturated group and at least one hydroxy group in its molecule,
 - d) 0 to 40 percent by weight of a hydroxy compound having no unsaturated groups,
 - e) 0 to 30 percent by weight of at least one liquid poly(meth)acrylate having a functionality of more than 2 and having no hydroxy groups,
 - f) 0 to 40 percent by weight of at least one liquid cycloaliphatic or aromatic di(meth)acrylate having no hydroxy groups, and
 - g) 0 to 10 percent by weight of a reactive diluent,
- wherein the sum of components a), b), c), d), e), f) and g) is 100 percent by weight, and components c), d), e), f) and g) are different, and the composition contains no free radical initiator.

2. A composition according to claim 1, which contains 50 to 80, preferably 60 to 80, more preferably 65 to 80 percent by weight of component a).

3. A composition according to claim 1, which contains 0.5 to 6, preferably 0.5 to 3, more preferably 1.0 to 1.5 percent by weight of component b).

4. A composition according to claim 1, which contains 5 to 25, preferably 7 to 20, more preferably 10 to 15 percent by weight of component c).

5. A composition according to claim 1, which contains 5 to 40, preferably 7 to 35, more preferably 10 to 30, most preferably 12 to 20 percent by weight of component d).

6. A composition according to claim 1, which contains 4 to 30 percent by weight of component).

7. A composition according to claim 1 ~~or claim 6~~, wherein component e) is not more than 50 percent by weight of the entire (meth)acrylate content.

8. A composition according to claim 1, which contains 5 to 40 percent by weight of component f).

9. A composition according to claim 1, wherein component (a) contains oxirane (epoxide) rings in the molecule.

10. A composition according to claim 1 comprising

- a1) 20 to 60 percent by weight of an aromatic difunctional or more highly functional polyglycidyl ether or of a liquid mixture consisting of aromatic difunctional or more highly functional polyglycidyl ethers,
- a2) 0 to 50 percent by weight of an aliphatic or cycloaliphatic glycidyl ether,
- c) 3 to 30 percent by weight of a compound or mixture of compounds having at least three unsaturated groups and a hydroxyl group in its molecule,
- d) 5 to 40 percent by weight of a cycloaliphatic compound having at least 2 hydroxyl groups and/or of a cycloaliphatic compound having at least 2 hydroxyl groups which is reacted with ethylene oxide, propylene oxide or with ethylene oxide and propylene oxide,
- e) 4 to 30 percent by weight of at least one liquid poly(meth)acrylate having a (meth)acrylate functionality of more than 2,
- f) 0 to 20 percent by weight of one or more di(meth)acrylates.

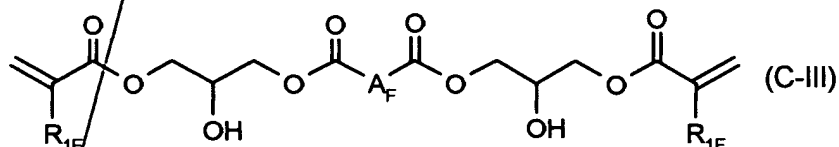
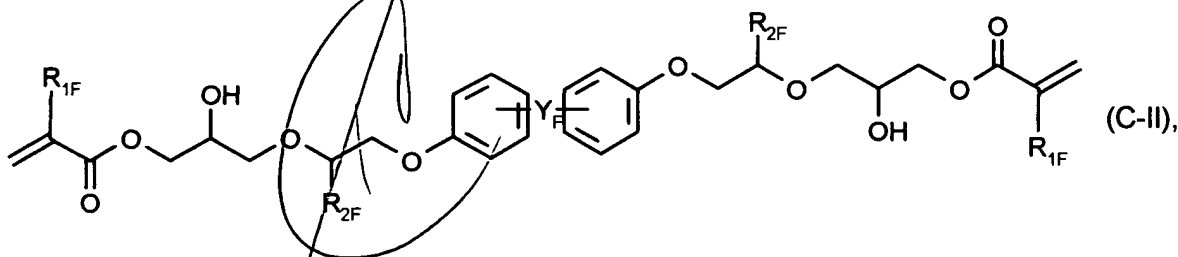
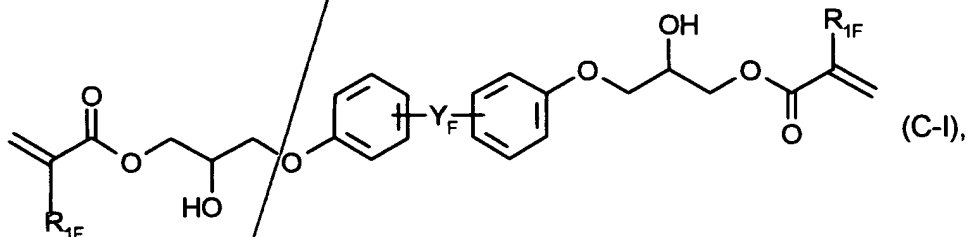
11. A composition according to claim 1, comprising:

- a) 40 to 80 percent by weight of an aliphatic and/or cycloaliphatic difunctional or more highly functional glycidyl ether or of a mixture of such resins,
- b) 2 to 7 percent by weight of a cationic photoinitiator or of a mixture of cationic photoinitiators,
- c) 3 to 30 percent by weight of a compound or mixture of compounds having at least three unsaturated groups and a hydroxyl group in its molecule,
- d) 10 to 20 percent by weight of a phenolic compound having at least 2 hydroxyl groups which is reacted with ethylene oxide, with propylene oxide or with ethylene oxide and propylene oxide,

- e) 4 to 10 percent by weight of at least one liquid poly(meth)acrylate having a (meth)acrylate functionality of more than 2, and
f) 4 to 10 percent by weight of one or more di(meth)acrylates.

12. A composition according to claim 1 wherein component c) contains a compound selected from the group consisting of

i) hydroxyl-containing (meth)acrylates of the formulae



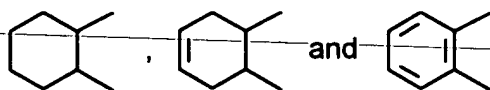
in which

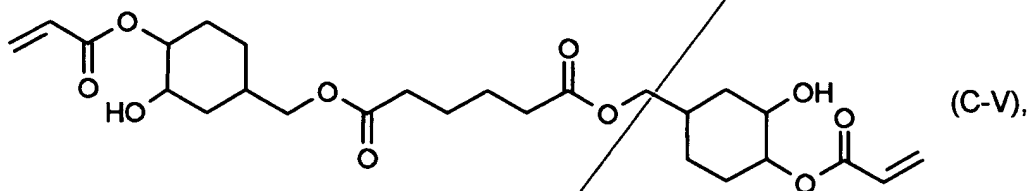
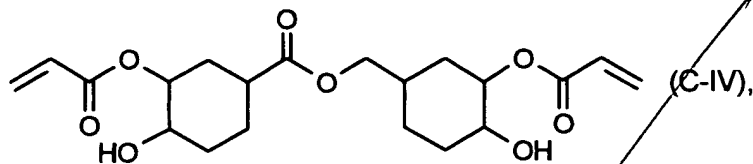
$\text{R}_{1\text{F}}$ is a hydrogen atom or methyl,

Y_F is a direct bond, $\text{C}_1\text{-C}_6$ alkylene, $-\text{S}-$, $-\text{O}-$, $-\text{SO}-$, $-\text{SO}_2-$ or $-\text{CO}-$,

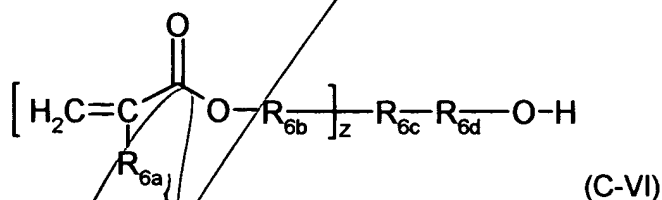
$\text{R}_{2\text{F}}$ is a $\text{C}_1\text{-C}_8$ alkyl group, a phenyl group which is unsubstituted or substituted by one or more $\text{C}_1\text{-C}_4$ alkyl groups, hydroxyl groups or halogen atoms, or is a radical of the formula $-\text{CH}_2\text{-OR}_{3\text{F}}$ in which $\text{R}_{3\text{F}}$ is a $\text{C}_1\text{-C}_8$ alkyl group or phenyl group, and

A_F is a radical selected from the radicals of the formulae



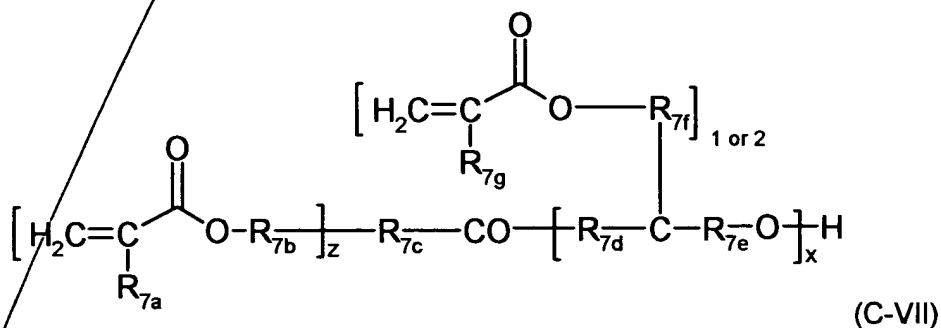


ii) hydroxyl-containing (meth)acrylates according to the formula



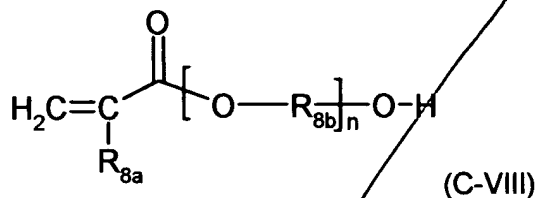
wherein R_{6a} is H or $\text{C}_1\text{-C}_4$ alkyl, R_{6b} and R_{6d} are, independently of one another divalent linear or branched linking groups having 1 to 20 carbon atoms that are optionally substituted one or more times with $\text{C}_1\text{-C}_4$ alkyl, hydroxyl or interrupted one or more times by a carbonyl group, R_{6c} is a multi-valent linear or branched group having 1 to 4 carbon atoms, z is an integer from 1 to 3,

or according to the formula



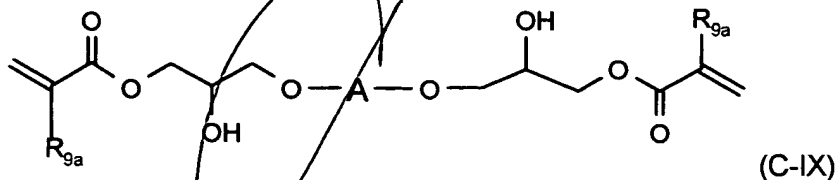
wherein R_{7a} and R_{7g} are independently of one another H or $\text{C}_1\text{-C}_4$ alkyl, R_{7c} is a multi-valent group having 1 to 4 carbon atoms, R_{7b} , R_{7d} , R_{7e} and R_{7f} are, independently of one another, divalent linear or branched radicals having 1 to 20 carbon atoms that are optionally substituted one or more times with $\text{C}_1\text{-C}_4$ alkyl, hydroxyl or interrupted one or more times by a carbonyl group, x is an integer from 1 to 4 and z is an integer from 1 to 3,

or according to the formula



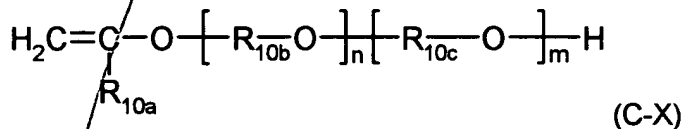
wherein R_{8a} is H or $\text{C}_1\text{-C}_4$ alkyl and R_{8b} is a divalent linear or branched group having 2 to 6 carbon atoms,

or according to the formula



wherein R_{9a} is H or $\text{C}_1\text{-C}_4$ alkyl and A is a divalent linear or branched linking group having 2 to 10 carbon atoms,

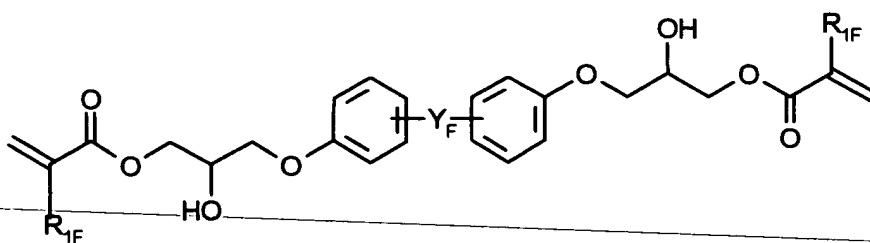
iii) hydroxyl-containing vinyl ethers according to the formulae



wherein x and y are integers from 0 to 20, R_{10a} is H or $\text{C}_1\text{-C}_4$ alkyl, R_{10b} is an aliphatic group having 3 to 10 carbon atoms, R_{10c} is a cycloaliphatic, aromatic, aliphatic-aromatic or aliphatic-cycloaliphatic group having 5 to 24 carbon atoms, n is an integer from 0 to 5 and m is an integer from 0 to 5, and

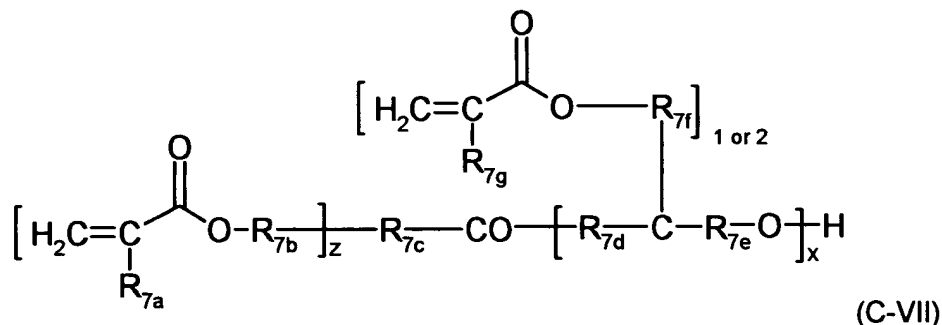
iv) hydroxyl-containing poly(meth)acrylates obtained by replacing at least some of the available hydroxyl groups of the compounds of formula (C-I) to (C-IX) with epoxy groups.

13. A composition according to claim 1 wherein component c) contains at least one compound according to formula



wherein R_{1F} is hydrogen and Y_F is $-\text{C}(\text{CH}_3)_2-$.

14. A composition according to claim 1 wherein component c) contains at least one compound according to formula



wherein R_{7a} and R_{7g} are H, R_{7b}, R_{7d}, R_{7e} and R_{7f} are methylene groups, R_{7c} is C, z is 3 and x is 1.

15. A composition according to claim 1 wherein component c) contains a compound or mixture of compounds having more than one unsaturated group per molecule.

16. A composition according to claim 1, in which component d) consists of phenolic compounds having at least 2 hydroxyl groups which are reacted with ethylene oxide, propylene oxide or with ethylene oxide and propylene oxide.

17. A method of producing a cured product, in which a composition according to any one of claims 1 to 16 is treated with actinic radiation.

18. A method for producing a three-dimensional shaped article in which the article is built up from a composition according to ~~any one of claims 1 to 16~~ ^{claim 2} with the aid of a repeating, alternating sequence of steps (a) and (b), in step (a), a layer of the composition, one boundary of which is the surface of the composition, is cured with the aid of appropriate radiation within a surface region which corresponds to the desired cross-sectional area of the three-dimensional article to be formed, at the height of this layer, and in step (b) the freshly cured layer is covered with a new layer of the radiation-curable, liquid composition, this sequence of steps (a) and (b) being repeated until an article having the desired shape is formed and this article is, if desired, subjected to post-curing.

add C¹